

REMARKS

Claims 1-28 are pending in the present application. In the Office Action, claim 1 stands rejected under 35 U.S.C. § 112, second paragraph.

Claims 1-2, 13, 16, and 24 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Kitahara et al. (EP0827838) in view of Barbehenn et al. (U.S. Patent No. 5,363,134; hereinafter “Barbehenn”), Takahiro et al. (JP 11058704; hereinafter “Takahiro”), and Takahashi (U.S. Patent No. 6,145,949; hereinafter “Takahashi”).

Additionally, claims 12 and 20 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Kitahara in view of Barbehenn, Takahiro, and Sekiya et al. (U.S. Patent No. 5,877,786; hereinafter “Sekiya”).

The Examiner has indicated that claims 3-11, 14-15, 17-19, 21-23 and 25-28 contain allowable subject matter.

I. Rejection under 35 U.S.C. § 112, second paragraph.

The Examiner rejected claim 1 under 35 U.S.C. § 112, second paragraph, as being allegedly indefinite because there is insufficient antecedent basis for the claim limitation “serial drive signals.” Accordingly, Applicant has amended claim 1 in a manner believed to overcome the rejection.

II. Rejection under 35 U.S.C. § 103(a) over Kitahara in view Barbehenn, Takahiro, and Takahashi

Claims 1-2, 13, 16, and 24 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Kitahara, in view of Barbehenn, Takahiro, and Takahashi.

As an initial matter, Applicant notes that the Examiner previously indicated that claim 1 was allowable in the December 23, 2004 Office Action, based on Applicant's arguments set forth in the August 23, 2004 Amendment.

A. Claim 1

Independent claim 1 recites that at least one drive signal from the plurality of serial drive signals is selected to adjust a displacement behavior of a piezoelectric vibrator associated with the identified nozzle orifice, *based on the associated correction data*.

The Examiner acknowledges that Kitahara, and Barbehenn fail to disclose the above-identified feature. However, the Examiner takes the position that Takahiro makes up for the deficiencies of Kitahara, and Barbehenn. In the August 23, 2004 Amendment, one of Applicant's arguments regarding Takahiro was that Takahiro fails to teach or suggest the above-identified feature regarding the associated correction data.

Particularly, Applicant argued that Takahiro merely teaches that the drive voltage value of the drive voltage waveform is controlled (adjusted) based on the variation correction data of the ink ejection and that the reference fails to teach or suggest that at least one drive signal is selected from a plurality of drive signals based on the variation correction data. Additionally,

Applicant argued that FIG. 1 of Takahiro shows that the correction means 11-1 ~ 11-N adjusts the drive voltage values of the drive voltage waveforms that were previously selected by selectors 3-1 ~ 3-N and that the selectors 3-1 ~ 3-N do not select the drive voltage waveforms based on the variation correction data, as required by claim 1.

In the responsive Office Action, dated December 23, 2004, the Examiner indicated that the subject matter of claim 1 was allowable because the cited combination of references failed to disclose “selecting at least one drive signal from the plurality of *serial* drive signals.” (emphasis added) (See pg. 6 of the Office Action dated December 23, 2004). However, the Examiner failed to respond to the additional argument presented in the August 23, 2004 Amendment (as set forth above), that Takahiro does not disclose or suggest that at least one drive signal is selected *based on the variation correction data*. The Examiner has also failed to respond to this argument in the current Office Action, where the Examiner has reinstated the rejection of claim 1. Instead, the Examiner merely repeated verbatim, the original arguments presented in the Office Action dated May 21, 2004.

Applicant notes that MPEP § 707.07(f) requires that “[w]here the [A]pplicant traverses any rejection, the [E]xaminer should, if he or she repeats the rejection, take note of the [A]pplicant’s argument and answer the substance of it.” (emphasis added). Therefore, Applicant submits that the Examiner’s failure to respond to the Applicant’s argument that Takahiro does not teach or suggest that at least one drive signal is selected *based on the variation correction data* was contrary to the directive clearly set forth in MPEP § 707.07(f) and that the Examiner

has not demonstrated how Takahiro makes up for the deficient teachings of Kitahara and Barbehenn.

In view of the above, Applicant maintains all of the arguments submitted in the August 23, 2004 Amendment, and again argues that Takahiro does not teach or suggest that at least one drive signal from the plurality of drive signals *is selected based on the associated correction data*. Accordingly, the Examiner should reconsider and withdraw the § 103(a) rejection of claim 1.

Additionally, claim 1 recites, *inter alia*, that at least one drive signal from the plurality of serial drive signals is selected ... based on the associated correction data (shown, for example, in the non-limiting embodiment of Fig. 4 of the present Application).

The Examiner correctly concedes that Kitahara, Barbehenn, and Takahiro fail to disclose the above-identified feature. However, the Examiner takes the position that Takahashi makes up for the deficiencies of Kitahara, Barbehenn and Takahiro, and alleges that Takahashi teaches this feature. Particularly, on page 6 of the Office Action, the Examiner contends that modifying the driving signals taught by Kitahara and Takahiro, such that the driving signals are serial as disclosed by Takahashi, would have been obvious. Applicant disagrees.

As a preliminary matter, Takahashi provides no rationale as to why or how one skilled in the art would modify each of the drive waveform signals (a), (b), (c), (d), (e), and (f) shown in FIG. 13 of Takahiro such that the drive waveform signals are serial as disclosed by Takahashi.

For example, Takahashi merely relates generally to the use of three drive waveforms having two or three pulses as shown in FIGS. 5A - 5C so that the recording density of ink ejected from nozzles 618 remain substantially constant regardless of ambient temperature. Col. 1, lines 7-10 & Col. 6, lines 10-13. In order to maintain a constant recording density of ink, Takahashi teaches that the drive voltage of the drive waveforms shown in FIGS. 5A - 5C is varied (i.e., lowered) as temperature rises to minimize the increase in recording density. (See FIGS. 4A - 4C & Col. 6, lines 56-61 of Takahashi). Additionally, Takahashi discloses that a recorder 1 is controlled to use one of the three drive waveforms shown in FIGS. 5A - 5C to eject ink from a nozzle 618 depending on ambient temperature variation. In other words, Takahashi teaches that the entire drive waveform (having two or three pulses) is selected by the recorder 1 to control ink recording density. The recorder 1 is not capable of selecting a single pulse from the drive waveforms shown in FIGS. 5A - 5C.

In contrast to the recorder 1 taught by Takahashi, the ink jet recording device disclosed by Takahiro utilizes first selectors 3-1 ~ 3N to select only one drive waveform signal having a single pulse from among the waveforms (a), (b), and (c) which are generated separately by drive voltage waveform generation means 2-1 ~ 2-N. Similarly, Takahiro teaches that second selectors 44-1 ~ 44-N may select only one drive voltage waveform having a single pulse among the waveforms (d), (e), and (f) which are generated separately by the second drive voltage waveform generation means 43-1 ~ 43-J. (See FIGS. 11 & 13 of Takahiro). The separately selected drive waveform signals having a single pulse corresponds to a desired ink discharge

quantity (or diameter dot) that is to be ejected from a nozzle by an ink regurgitation means (e.g., 1-1 ~ 1-N) based on gradation data of a record image. (See paragraphs 21 and 39 of Takahiro).

Assuming *arguendo* that the each of drive waveform generation means 2-1 ~ 2-N and 43-1 ~ 43-J *could* generate drive waveforms (a), (b), (c), (d), (e), and (f) serially in the manner disclosed by Takahashi, the first selectors 3-1 ~ 3-N and the second selectors 44-1 ~ 44-N would be required to select the entire drive waveform having multiple pulses (i.e., a waveform in which (a), (b), (c), (d), and (e) is serially provided). As a consequence, an ink regurgitation means (e.g. 1-1 ~ 1-N) would not be able to successfully eject a desired quantity of ink from a nozzle given that six pulses would be provided for ejecting ink. Thus, a skilled artisan would not and could not modify the drive waveform signals taught by Takahiro such that they are serial as disclosed by Takahashi. There simply is no reasonable expectation that the ink jet recording device taught by Takahiro can operate successfully with drive waveforms that are provided serially, as suggested by the Examiner. (See MPEP § 2143.01).

Moreover, there is no expressed or implied disclosure in Takahashi suggesting that the selected drive waveforms having a single pulse, as disclosed by Takahiro, should be generated serially. (See MPEP § 2143.01¹). The only teaching comes from Applicant's own disclosure, which constitutes impermissible hindsight reconstruction according to *In re Vaeck* 20 USPQ2d 1438, 1442 (Fed. Cir. 1991).

¹ MPEP § 2143.01 requires that "[w]hen a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references."

Applicant also submits that the Examiner has not addressed how the drive waveform signals taught by Kitahara may be generated *serially* and utilized in the ink jet recording device taught by Takahiro. As conceded by the Examiner, Kitahara does not teach that at least one drive signal is selected from the plurality of serial drive signals ... based on associated correction data, as claimed. The drive waveform signals taught by Takahiro are specific to the ink jet recording device disclosed therein and are not interchangeable with the drive waveforms taught by Kitahara.

In light of the discussion above, Applicant submits that Takahashi fails to cure the deficient teachings of Kitahara, Barbehenn, and Takahiro, and respectfully requests that the Examiner reconsider and withdraw the § 103(a) rejection of claim 1 for this additional reason.

B. Claims 2, 13, 16 and 24

Since claims 2, 13, 16, and 24 are dependent on claim 1, Applicant submits that such claims are patentable at least by virtue of their dependency.

III. Rejection under 35 U.S.C. § 103(a) over Kitahara in view of Barbehenn, Takahiro & Sekiya

Claims 12 and 20 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Kitahara in view of Barbehenn, Takahiro, and Sekiya.

A. Claim 12

Claim 12 recites a method of jetting liquid droplets, comprising, *inter alia*, identifying a difference between a designated amount and a measured amount of each liquid droplet, wherein volume differences among liquid droplets ejected by the respective drive signals are divided by a volume of a liquid droplet which is the minimum volume jetted by one drive signal.

In rejecting claim 12, the Examiner correctly concedes that Kitahara, Barbehenn, and Takihiro do not disclose the above features. However, the Examiner alleges that FIG. 3 of Sekiya teaches the above features recited in claim 12. For instance, on page 11 of the Office Action, the Examiner asserts that Sekiya teaches “volume differences among ink dots 26 [are] different number of ink droplets 24 constituting the dots, [and] the volume difference is dividable by the volume of one droplet 24 ejected by a single drive signal (a).” Applicant respectfully disagrees and submits that the Office Action is misinterpreting and/or misapplying the teachings of the reference since Sekiya does not disclose, teach or otherwise suggest dividing volume differences of liquid droplets, as required by claim 12.

Instead, Sekiya merely relates generally to an ink jet head in which a single dot 26 is recorded on a recording medium 25 using one or a plurality of ink droplets 24 so that the size of the “single dot 26 formed on the recording medium 25 is controlled.” Col. 1, lines 8-12 & Col. 7, lines 32-36. More particularly, Sekiya teaches that the number of ink droplets 24 forming the single dot 26 is controlled in accordance with the number of pulses successively input to a heater element 11 which generates a bubble in ink in order to eject ink from an orifice 22. As shown in FIG. 3(a) of Sekiya, when one pulse is supplied to heater element 11, one ink droplet 24 is ejected

from an orifice 22 and forms the single dot 26 which is incident on the recording medium. (See FIG. 3(a)). Col. 8, lines 60-62. Similarly, FIG. 3(b) shows that when three pulses are supplied to heater element 11, three ink droplets 24 are jetted from an orifice 22 to form single dot 26. Likewise, FIG. 3(c) of Sekiya demonstrates that five pulses are supplied to heater element 11 such that five ink droplets 24 are jetted from an orifice 22 whereas FIG. 3(d) of Sekiya illustrates that eight pulses are supplied to heater element 11 so that eight ink droplets 24 are jetted from an orifice 22. Further, Figs. 3 and 7 of Sekiya show that amounts of the respective jetted liquid droplets are the same, and widths of the drive pulses for jetting liquid droplets is the same as each other.

Even assuming *arguendo* that there are volume differences in each of the ink droplets 24 taught by Sekiya, and even if it were assumed in this case that the ink droplet 24 which is jetted as a result of the single pulse shown in FIG. 3(a) of Sekiya has a minimum volume as alleged by the Examiner, there is no disclosure or suggestion in Sekiya that volume differences among the ink droplets 24 ejected by the pulses (shown in FIGS. 3(a), 3(b), & 3(c)) are divided by a volume of a single ink droplet 24 jetted by the single pulse shown in FIG. 3(a). Nowhere in Sekiya is there any disclosure or suggestion relating to dividing volume differences among liquid droplets, as required by claim 12. Sekiya therefore does not teach and is incapable of suggesting volume differences among liquid droplets ejected by the respective drive signals are divided by a volume of a liquid droplet which is the minimum volume jetted by one drive signal, as claimed.

In view of the above, Applicant submits that Sekiya fails to cure the deficient teachings of Kitahara, Barbehenn, and Takahiro and the Examiner should reconsider and withdraw the § 103(a) rejection of claim 12.

B. Claim 20

Since claim 20 contains features that are analogous to the features recited in claim 12, Applicant submits that claim 20 is patentable for the reasons submitted for claim 12.

IV. Allowable Subject Matter

The Examiner objects to claim 26 as being dependent upon a rejected base claim, but notes that claim 26 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant requests the Examiner to withdraw the objection of claim 26 since Applicant believes that independent claim 1 is patentable in view of the arguments presented above.


V. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Amendment under 37 C.F.R. § 1.111
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